



11

SEQUENCE LISTING

<110> ALDAZ, MARCELO C.
BEDNAREK, ANDRZEJ

<120> WWOX: A PUTATIVE TUMOR SUPPRESSOR GENE MUTATED IN
MULTIPLE CANCERS

<130> UTSC:671US

<140> 09/978,318

<141> 2001-10-15

<150> 60/240,277

<151> 2000-10-13

<160> 68

<170> PatentIn Ver. 2.1

<210> 1

<211> 414

<212> PRT

<213> Human

<400> 1

Met Ala Ala Leu Arg Tyr Ala Gly Leu Asp Asp Thr Asp Ser Glu Asp
1 5 10 15

Glu Leu Pro Pro Gly Trp Glu Glu Arg Thr Thr Lys Asp Gly Trp Val
20 25 30

Tyr Tyr Ala Asn His Thr Glu Glu Lys Thr Gln Trp Glu His Pro Lys
35 40 45

Thr Gly Lys Arg Lys Arg Val Ala Gly Asp Leu Pro Tyr Gly Trp Glu
50 55 60

Gln Glu Thr Asp Glu Asn Gly Gln Val Phe Phe Val Asp His Ile Asn
65 70 75 80

Lys Arg Thr Thr Tyr Leu Asp Pro Arg Leu Ala Phe Thr Val Asp Asp
85 90 95

Asn Pro Thr Lys Pro Thr Thr Arg Gln Arg Tyr Asp Gly Ser Thr Thr
100 105 110

Ala Met Glu Ile Leu Gln Gly Arg Asp Phe Thr Gly Lys Val Val Val
115 120 125

Val Thr Gly Ala Asn Ser Gly Ile Gly Phe Glu Thr Ala Lys Ser Phe
130 135 140

Ala Leu His Gly Ala His Val Ile Leu Ala Cys Arg Asn Met Ala Arg
145 150 155 160

Ala Ser Glu Ala Val Ser Arg Ile Leu Glu Glu Trp His Lys Ala Lys
 165 170 175
 Val Glu Ala Met Thr Leu Asp Leu Ala Leu Leu Arg Ser Val Gln His
 180 185 190
 Phe Ala Glu Ala Phe Lys Ala Lys Asn Val Pro Leu His Val Leu Val
 195 200 205
 Cys Asn Ala Ala Thr Phe Ala Leu Pro Trp Ser Leu Thr Lys Asp Gly
 210 215 220
 Leu Glu Thr Thr Phe Gln Val Asn His Leu Gly His Phe Tyr Leu Val
 225 230 235 240
 Gln Leu Leu Gln Asp Val Leu Cys Arg Ser Ala Pro Ala Arg Val Ile
 245 250 255
 Val Val Ser Ser Glu Ser His Arg Phe Thr Asp Ile Asn Asp Ser Leu
 260 265 270
 Gly Lys Leu Asp Phe Ser Arg Leu Ser Pro Thr Lys Asn Asp Tyr Trp
 275 280 285
 Ala Met Leu Ala Tyr Asn Arg Ser Lys Leu Cys Asn Ile Leu Phe Ser
 290 295 300
 Asn Glu Leu His Arg Arg Leu Ser Pro Arg Gly Val Thr Ser Asn Ala
 305 310 315 320
 Val His Pro Gly Asn Met Met Tyr Ser Asn Ile His Arg Ser Trp Trp
 325 330 335
 Val Tyr Thr Leu Leu Phe Thr Leu Ala Arg Pro Phe Thr Lys Ser Met
 340 345 350
 Gln Gln Gly Ala Ala Thr Thr Val Tyr Cys Ala Ala Val Pro Glu Leu
 355 360 365
 Glu Gly Leu Gly Gly Met Tyr Phe Asn Asn Cys Cys Arg Cys Met Pro
 370 375 380
 Ser Pro Glu Ala Gln Ser Glu Glu Thr Ala Arg Thr Leu Trp Ala Leu
 385 390 395 400
 Ser Glu Arg Leu Ile Gln Glu Arg Leu Gly Ser Gln Ser Gly
 405 410

<210> 2
 <211> 2264
 <212> DNA
 <213> Human

<400> 2

```
gcagtgcgca ggcgtgagcg gtcggggcccc gacgcgcgcg ggtctcgttt ggagcgggag 60
tgagttcctg agcgagtggg cccggcagcg ggcgataggg gggccaggtg cctccacagt 120
cagccatggc agcgctgcgc tacgcggggc tggacgacac ggacagtgag gacgagctgc 180
ctccgggctg ggaggagaga accaccaagg acggctgggt ttactacgcc aatcacaccg 240
aggagaagac tcagtgggaa catccaaaaa ctggaaaaag aaaacgagtg gcaggagatt 300
tgccatacgg atgggaacaa gaaactgatg agaacggaca agtggttttt gttgaccata 360
taaataaaaag aaccacctac ttggacccaa gactggcggt tactgtggat gataatccga 420
ccaagccaac caccgggcaa agatacgacg gcagcaccac tgccatggaa attctccagg 480
gccgggattt cactggcaaa gtggttgtgg tctactggagc taattcagga ataggggttcg 540
aaaccgccaa gtcttttgcc ctccatggtg cacatgtgat cttggcctgc aggaacatgg 600
caagggcgag tgaagcagtg tcacgcattt tagaagaatg gcataaagcc aaggtagaag 660
caatgaccct ggacctcgct ctgctccgta gcgtgcagca ttttgctgaa gcattcaagg 720
ccaagaatgt gcctcttcat gtgcttgtgt gcaacgcagc aacttttgct ctaccctgga 780
gtctcaccaa agatggcctg gagaccacct ttcaagtga tcatctgggg cacttctacc 840
ttgtccagct cctccaggat gttttgtgcc gctcagctcc tgcccgtgtc attgtggtct 900
cctcagagtc ccatcgattt acagatatta acgactcctt gggaaaactg gacttcagtc 960
gcctctctcc aacaaaaaac gactattggg cgatgctggc ttataacagg tccaagctct 1020
gcaacatcct cttctccaac gagctgcacc gtgcctctc cccacgcggg gtcacgtcga 1080
acgcagtgca tcctggaaat atgatgtact ccaacattca tcgcagctgg tgggtgtaca 1140
cactgctgtt taccttggcg aggcctttca ccaagtccat gcaacaggga gctgccacca 1200
ccgtgtactg tgctgctgtc ccagaactgg agggctctggg agggatgtac ttcaacaact 1260
gctgccgctg catgccctca ccagaagctc agagcgaaga gacggcccgg accctgtggg 1320
cgctcagcga gaggtgatc caagaacggc ttggcagcca gtccggctaa gtggagctca 1380
gagcggatgg gcacacacac ccgcctgtg tgtgtccct caccgaagt ccagggctgg 1440
gccccttcca aatgtccctc caacacagat ccgcaagagt aaaggaaata agagcagtc 1500
caacagagtg aaaaatctta agtaccaatg ggaagcaggg aattcctggg gtaaagtatc 1560
acttttctgg ggctgggcta ggcataggtc tctttgcttt ctggtggtgg cctgtttgaa 1620
agtaaaaaac tgcttgggtg gttaggttccg tatctccctg gagaagcacc agcaattctc 1680
tttcttttac tgttatagaa tagcctgagg tccctcgtc ccatccagct accaccacgg 1740
ccaccactgc agccggggggc tggccttctc ctacttaggg aagaaaaagc aagtgttcac 1800
tgctccttgc tgcattgatc caggagataa ttgtttcatt catcctgacc aagactgagc 1860
cagcttagca actgctgggg agacaaatct cagaaccttg tcccagccag tgaggatgac 1920
agtgcacccc agaggggagta gaatacgagc aactaccagg tggcaaagta cttgtcatag 1980
actcctttgc taatgctatg caaaaaattc tttagagatt ataacaatt tttcaaatca 2040
ttccttagat accttgaag gcaggaaggg aagcgtatat acttaagaat acacaggata 2100
ttttgggggg cagagaataa aacgttagtt aatccctttg tctgtcaatc acagtctcag 2160
ttctcttgc ttcacattgt acttaaacct cctgctgtgc ctgcctcct atgcttaata 2220
aaagaacatg cttgaatatc aaaaaaaaaa aaaaaaaaaa aaaa 2264
```

<210> 3

<211> 26

<212> DNA

<213> Homo sapiens

<400> 3

acgggtggtgg cagctccctg ttgttg

26

<210> 4

<211> 29

<212> DNA

<213> Homo sapiens

<400> 4
acggtggtgg cagctccctg ttgcgatgg 29

<210> 5
<211> 33
<212> DNA
<213> Homo sapiens

<400> 5
acggtggtgg cagctccctg ttgacattct tgg 33

<210> 6
<211> 32
<212> DNA
<213> Homo sapiens

<400> 6
acggtggtgg cagctccctg ttgccattct tc 32

<210> 7
<211> 30
<212> DNA
<213> Homo sapiens

<400> 7
acggtggtgg cagctccctg ttgctattcc 30

<210> 8
<211> 33
<212> DNA
<213> Homo sapiens

<400> 8
tgggtggcagc tccctgttgt caacaaaaaa cac 33

<210> 9
<211> 27
<212> DNA
<213> Homo sapiens

<400> 9
acggtggtgg cagctccctg ttgctcc 27

<210> 10
<211> 19
<212> DNA
<213> Homo sapiens

<400> 10

tcgcagctgg .tggtgtac 19

<210> 11
<211> 21
<212> DNA
<213> Homo sapiens

<400> 11
agctccctgt tgcattgact t 21

<210> 12
<211> 22
<212> DNA
<213> Homo sapiens

<400> 12
tgattgctgt ctccattgtt ga 22

<210> 13
<211> 22
<212> DNA
<213> Homo sapiens

<400> 13
tctgtccccc acctctaagt tg 22

<210> 14
<211> 21
<212> DNA
<213> Homo sapiens

<400> 14
aggcattgct caggcattgag c 21

<210> 15
<211> 22
<212> DNA
<213> Homo sapiens

<400> 15
cagccctggc atttgctga gg 22

<210> 16
<211> 22
<212> DNA
<213> Homo sapiens

<400> 16
tgctgaggg gacacacac gg 22

<210> 17
 <211> 23
 <212> DNA
 <213> Homo sapiens

 <400> 17
 gagttcctga gcgagtggac ccg 23

<210> 18
 <211> 30
 <212> DNA
 <213> Homo sapiens

 <400> 18
 tagtttttat tattattagt ttttattatt 30

<210> 19
 <211> 22
 <212> DNA
 <213> Homo sapiens

 <400> 19
 aatactacat cctaaacaac aa 22

<210> 20
 <211> 30
 <212> DNA
 <213> Homo sapiens

 <400> 20
 agtttttatt attatgagtt tttattaaat 30

<210> 21
 <211> 20
 <212> DNA
 <213> Homo sapiens

<220>
 <221> modified_base
 <222> (3)..(5)
 <223> R = A OR G

 <400> 21
 cccrcaata ctacatccta 20

<210> 22
 <211> 20
 <212> DNA

<213> Homo sapiens
 <220>
 <221> modified_base
 <222> (11)
 <223> Y = C OR T/U
 <400> 22
 gggatgaggt ygttttggtt 20

<210> 23
 <211> 24
 <212> DNA
 <213> Homo sapiens
 <400> 23
 tcataaatct ctattaaaca acaa 24

<210> 24
 <211> 21
 <212> DNA
 <213> Homo sapiens
 <220>
 <221> modified_base
 <222> (2)
 <223> Y = C OR T/U
 <400> 24
 gygtagtggt gtattttgaa t 21

<210> 25
 <211> 28
 <212> DNA
 <213> Homo sapiens
 <400> 25
 tcacaatctc tattatatat tttaacta 28

<210> 26
 <211> 19
 <212> DNA
 <213> Homo sapiens
 <220>
 <221> modified_base
 <222> (9) .. (11)
 <223> R = A OR G
 <400> 26
 tcctccccc rcaaataac 19

<210> 27
<211> 30
<212> DNA
<213> Homo sapiens

<400> 27
ttattattat gagtttttat taaataatag

30

<210> 28
<211> 1625
<212> DNA
<213> Homo sapiens

<400> 28
ggcacgaggc agtgcgagc cgtgagcggc cgggccccga cgcgcgcggg tctcgtttgg 60
agcgggagtg agttcctgag cgagtggacc cggcagcggg cgataggggg gccaggtgcc 120
tccacagtca gccatggcag cgctgcgcta cgcggggctg gacgacacgg acagtgagga 180
cgagctgcct ccgggctggg aggagagAAC caccaaggac ggctgggttt actacgcca 240
tcacaccgag gagaagactc agtgggaaca tccaaaaact ggaaaaagaa aacgagtggc 300
aggagatttg ccatacggat gggaacaaga aactgatgag aacggacaag tgttttttgt 360
tgaccatata aataaaagaa ccacctactt ggacccaaga ctggcgttta ctgtggatga 420
taatccgacc aagccaacca cccggcaag atacgacggc agcaccactg ccatggaaat 480
tctccagggc cgggatttca ctggcaaat gggtgtggtc actggagcta attcaggaat 540
agcaacaggg agctgccacc accgtgtact gtgctgctgt cccagaactg gagggtctgg 600
gagggatgta cttcaacaac tgctgcgct ccatgccttc accagaagct cagagcgaag 660
agacggcccg gaccctgttg gcgctcagcg agaggctgat ccaagaacgg cttggcagcc 720
agtccggcta agtggagctc agagcggatg ggcacacaca cccgcctgt gtgtgtcccc 780
tcacgcaagt gccagggctg ggcccccttc aaatgtccct ccaacacaga tccgcaagag 840
taaaggaaat aagagcagtc acaacagagt gaaaaatctt aagtaccaat gggaagcagg 900
gaattcctgg ggtaaagtat cacttttctg gggctgggct aggcataagg ctctttgctt 960
tctggtggtg gcctgtttga aagtaaaac ctgcttggtg tgtaggttcc gtatctccct 1020
ggagaagcac cagcaattct ctttctttta ctggtataga atagcctgag gtccccctcg 1080
cccatccagc taccaccacg gccaccactg cagccggggg ctggccttct cctacttagg 1140
gaagaaaaag caagtgttca ctgctccttg ctgcattgat ccaggagata attgtttcat 1200
tcaccttgac caagactgag ccagcttagc aactgctggg gagacaaatc tcagaacctt 1260
gtcccagcca gtgaggatga cagtgcacc cagagggagt agaatacgca gaactaccag 1320
gtggcaagt acttgtcata gactcctttg ctaatgctat gcaaaaaatt ctttagagat 1380
tataacaaat ttttcaaact attccttaga taccttgaaa ggcaggaagg gaagcgata 1440
tacttaagaa tacacaggat attttggggg gcagagaata aaacgttagt taatcccttt 1500
gtctgtcaat cacagtctca gttctcttg tttcacattg tacttaaacc tctgtctgtg 1560
cctcgcatcc tatgcttaat aaaagaacat gcttgaatat caaaaaaaaa aaaaaaaaaa 1620
aaaaa 1625

<210> 29
<211> 23
<212> DNA
<213> Homo sapiens

<400> 29
tagtggtgta ttttgaatag tag

23

<210> 30
 <211> 1625
 <212> DNA
 <213> Homo sapiens

<220>
 <221> CDS
 <222> (134)..(1069)

<400> 30
 ggcacgaggc agtgcgcagg cgtgagcggg cgggccccga cgcgcgcggg tctcgtttgg 60
 agcgggagtg agttcctgag cgagtggacc cggcagcggg cgataggggg gccaggtgcc 120
 tccacagtca gcc atg gca gcg ctg cgc tac gcg ggg ctg gac gac acg 169
 Met Ala Ala Leu Arg Tyr Ala Gly Leu Asp Asp Thr
 1 5 10
 gac agt gag gac gag ctg cct ccg ggc tgg gag gag aga acc acc aag 217
 Asp Ser Glu Asp Glu Leu Pro Pro Gly Trp Glu Glu Arg Thr Thr Lys
 15 20 25
 gac ggc tgg gtt tac tac gcc aat cac acc gag gag aag act cag tgg 265
 Asp Gly Trp Val Tyr Tyr Ala Asn His Thr Glu Glu Lys Thr Gln Trp
 30 35 40
 gaa cat cca aaa act gga aaa aga aaa cga gtg gca gga gat ttg cca 313
 Glu His Pro Lys Thr Gly Lys Arg Lys Arg Val Ala Gly Asp Leu Pro
 45 50 55 60
 tac gga tgg gaa caa gaa act gat gag aac gga caa gtg ttt ttt gtt 361
 Tyr Gly Trp Glu Gln Glu Thr Asp Glu Asn Gly Gln Val Phe Phe Val
 65 70 75
 gac cat ata aat aaa aga acc acc tac ttg gac cca aga ctg gcg ttt 409
 Asp His Ile Asn Lys Arg Thr Thr Tyr Leu Asp Pro Arg Leu Ala Phe
 80 85 90
 act gtg gat gat aat ccg acc aag cca acc acc cgg caa aga tac gac 457
 Thr Val Asp Asp Asn Pro Thr Lys Pro Thr Thr Arg Gln Arg Tyr Asp
 95 100 105
 ggc agc acc act gcc atg gaa att ctc cag ggc cgg gat ttc act ggc 505
 Gly Ser Thr Thr Ala Met Glu Ile Leu Gln Gly Arg Asp Phe Thr Gly
 110 115 120
 aaa gtg gtt gtg gtc act gga gct aat tca gga ata gca aca ggg agc 553
 Lys Val Val Val Val Thr Gly Ala Asn Ser Gly Ile Ala Thr Gly Ser
 125 130 135 140
 tgc cac cac cgt gta ctg tgc tgc tgt ccc aga act gga ggg tct ggg 601
 Cys His His Arg Val Leu Cys Cys Cys Pro Arg Thr Gly Gly Ser Gly
 145 150 155

agg gat gta ctt caa caa ctg ctg ccg ctg cat gcc ctc acc aga agc	649
Arg Asp Val Leu Gln Gln Leu Leu Pro Leu His Ala Leu Thr Arg Ser	
160 165 170	
tca gag cga aga gac ggc ccg gac cct gtg ggc gct cag cga gag gct	697
Ser Glu Arg Arg Asp Gly Pro Asp Pro Val Gly Ala Gln Arg Glu Ala	
175 180 185	
gat cca aga acg gct tgg cag cca gtc cgg cta agt gga gct cag agc	745
Asp Pro Arg Thr Ala Trp Gln Pro Val Arg Leu Ser Gly Ala Gln Ser	
190 195 200	
gga tgg gca cac aca ccc gcc ctg tgt gtg tcc cct cac gca agt gcc	793
Gly Trp Ala His Thr Pro Ala Leu Cys Val Ser Pro His Ala Ser Ala	
205 210 215 220	
agg gct ggg ccc ctt cca aat gtc cct cca aca cag atc cgc aag agt	841
Arg Ala Gly Pro Leu Pro Asn Val Pro Pro Thr Gln Ile Arg Lys Ser	
225 230 235	
aaa gga aat aag agc agt cac aac aga gtg aaa aat ctt aag tac caa	889
Lys Gly Asn Lys Ser Ser His Asn Arg Val Lys Asn Leu Lys Tyr Gln	
240 245 250	
tgg gaa gca ggg aat tcc tgg ggt aaa gta tca ctt ttc tgg ggc tgg	937
Trp Glu Ala Gly Asn Ser Trp Gly Lys Val Ser Leu Phe Trp Gly Trp	
255 260 265	
gct agg cat agg tct ctt tgc ttt ctg gtg gtg gcc tgt ttg aaa gta	985
Ala Arg His Arg Ser Leu Cys Phe Leu Val Val Ala Cys Leu Lys Val	
270 275 280	
aaa acc tgc ttg gtg tgt agg ttc cgt atc tcc ctg gag aag cac cag	1033
Lys Thr Cys Leu Val Cys Arg Phe Arg Ile Ser Leu Glu Lys His Gln	
285 290 295 300	
caa ttc tct ttc ttt tac tgt tat aga ata gcc tga ggtcccctcg	1079
Gln Phe Ser Phe Phe Tyr Cys Tyr Arg Ile Ala	
305 310	
tcccatccag ctaccaccac ggccaccact gcagccgggg gctggccttc tcctacttag	1139
ggaagaaaaa gcaagtgttc actgctcctt gctgcattga tccaggagat aattgtttca	1199
ttcatcctga ccaagactga gccagcttag caactgctgg ggagacaaat ctcagaacct	1259
tgtcccagcc agtgaggatg acagtgcacac ccagagggag tagaatacgc agaactacca	1319
gggtggcaaag tacttgtcat agactccttt gctaatagcta tgcaaaaaat tcttttagaga	1379
ttataacaaa tttttcaaat cattccttag ataccttgaa aggcaggaag ggaagcgtat	1439
atacttaaga atacacagga tattttgggg ggcagagaat aaaacgttag ttaatccctt	1499
tgtctgtcaa tcacagtctc agttctcttg ctttcacatt gtacttaaac ctctgctgt	1559

gcctcgcatc ctatgcttaa taaaagaaca tgcttgaata tcaaaaaaaaa aaaaaaaaaa 1619

aaaaaa

1625

<210> 31
<211> 311
<212> PRT
<213> Homo sapiens

<400> 31
Met Ala Ala Leu Arg Tyr Ala Gly Leu Asp Asp Thr Asp Ser Glu Asp
1 5 10 15
Glu Leu Pro Pro Gly Trp Glu Glu Arg Thr Thr Lys Asp Gly Trp Val
20 25 30
Tyr Tyr Ala Asn His Thr Glu Glu Lys Thr Gln Trp Glu His Pro Lys
35 40 45
Thr Gly Lys Arg Lys Arg Val Ala Gly Asp Leu Pro Tyr Gly Trp Glu
50 55 60
Gln Glu Thr Asp Glu Asn Gly Gln Val Phe Phe Val Asp His Ile Asn
65 70 75 80
Lys Arg Thr Thr Tyr Leu Asp Pro Arg Leu Ala Phe Thr Val Asp Asp
85 90 95
Asn Pro Thr Lys Pro Thr Thr Arg Gln Arg Tyr Asp Gly Ser Thr Thr
100 105 110
Ala Met Glu Ile Leu Gln Gly Arg Asp Phe Thr Gly Lys Val Val Val
115 120 125
Val Thr Gly Ala Asn Ser Gly Ile Ala Thr Gly Ser Cys His His Arg
130 135 140
Val Leu Cys Cys Cys Pro Arg Thr Gly Gly Ser Gly Arg Asp Val Leu
145 150 155 160
Gln Gln Leu Leu Pro Leu His Ala Leu Thr Arg Ser Ser Glu Arg Arg
165 170 175
Asp Gly Pro Asp Pro Val Gly Ala Gln Arg Glu Ala Asp Pro Arg Thr
180 185 190
Ala Trp Gln Pro Val Arg Leu Ser Gly Ala Gln Ser Gly Trp Ala His
195 200 205
Thr Pro Ala Leu Cys Val Ser Pro His Ala Ser Ala Arg Ala Gly Pro
210 215 220
Leu Pro Asn Val Pro Pro Thr Gln Ile Arg Lys Ser Lys Gly Asn Lys
225 230 235 240
Ser Ser His Asn Arg Val Lys Asn Leu Lys Tyr Gln Trp Glu Ala Gly
245 250 255
Asn Ser Trp Gly Lys Val Ser Leu Phe Trp Gly Trp Ala Arg His Arg
260 265 270
Ser Leu Cys Phe Leu Val Val Ala Cys Leu Lys Val Lys Thr Cys Leu
275 280 285
Val Cys Arg Phe Arg Ile Ser Leu Glu Lys His Gln Gln Phe Ser Phe
290 295 300
Phe Tyr Cys Tyr Arg Ile Ala
305 310

<210> 32
<211> 1732
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (134) .. (838)

<400> 32
ggcacgagggc agtgcgcgagg cgtgagcggt cgggccccga cgcgcgcggg tctcgtttgg 60
agcgggagtg agttcctgag cgagtggacc cggcagcggg cgataggggg gccaggtgcc 120
tccacagtca gcc atg gca gcg ctg cgc tac gcg ggg ctg gac gac acg 169
Met Ala Ala Leu Arg Tyr Ala Gly Leu Asp Asp Thr
1 5 10
gac agt gag gac gag ctg cct ccg ggc tgg gag gag aga acc acc aag 217
Asp Ser Glu Asp Glu Leu Pro Pro Gly Trp Glu Glu Arg Thr Thr Lys
15 20 25
gac ggc tgg gtt tac tac gcc aat cac acc gag gag aag act cag tgg 265
Asp Gly Trp Val Tyr Tyr Ala Asn His Thr Glu Glu Lys Thr Gln Trp
30 35 40
gaa cat cca aaa act gga aaa aga aaa cga gtg gca gga gat ttg cca 313
Glu His Pro Lys Thr Gly Lys Arg Lys Arg Val Ala Gly Asp Leu Pro
45 50 55 60
tac gga tgg gaa caa gaa act gat gag aac gga caa gtg ttt ttt gtt 361
Tyr Gly Trp Glu Gln Glu Thr Asp Glu Asn Gly Gln Val Phe Phe Val
65 70 75
gac cat ata aat aaa aga acc acc tac ttg gac cca aga ctg gcg ttt 409
Asp His Ile Asn Lys Arg Thr Thr Tyr Leu Asp Pro Arg Leu Ala Phe
80 85 90
act gtg gat gat aat ccg acc aag cca acc acc cgg caa aga tac gac 457
Thr Val Asp Asp Asn Pro Thr Lys Pro Thr Thr Arg Gln Arg Tyr Asp
95 100 105
ggc agc acc act gcc atg gaa att ctc cag ggc cgg gat ttc act ggc 505
Gly Ser Thr Thr Ala Met Glu Ile Leu Gln Gly Arg Asp Phe Thr Gly
110 115 120
aaa gtg gtt gtg gtc act gga gct aat tca gga ata ggg ttc gaa acc 553
Lys Val Val Val Val Thr Gly Ala Asn Ser Gly Ile Gly Phe Glu Thr
125 130 135 140
gcc aag tct ttt gcc ctc cat ggt gca cat gtg atc ttg gcc tgc agg 601
Ala Lys Ser Phe Ala Leu His Gly Ala His Val Ile Leu Ala Cys Arg
145 150 155
aac atg gca agg gcg agt gaa gca gtg tca cgc att tta gaa gaa tgg 649

Asn Met Ala Arg Ala Ser Glu Ala Val Ser Arg Ile Leu Glu Glu Trp	
160 165 170	
caa cag gga gct gcc acc acc gtg tac tgt gct gct gtc cca gaa ctg	697
Gln Gln Gly Ala Ala Thr Thr Val Tyr Cys Ala Ala Val Pro Glu Leu	
175 180 185	
gag ggt ctg gga ggg atg tac ttc aac aac tgc tgc cgc tgc atg ccc	745
Glu Gly Leu Gly Gly Met Tyr Phe Asn Asn Cys Cys Arg Cys Met Pro	
190 195 200	
tca cca gaa gct cag agc gaa gag acg gcc cgg acc ctg tgg gcg ctc	793
Ser Pro Glu Ala Gln Ser Glu Glu Thr Ala Arg Thr Leu Trp Ala Leu	
205 210 215 220	
agc gag agg ctg atc caa gaa cgg ctt ggc agc cag tcc ggc taa	838
Ser Glu Arg Leu Ile Gln Glu Arg Leu Gly Ser Gln Ser Gly	
225 230 235	
gtggagctca gagcggatgg gcacacacac ccgccctgtg tgtgtcccct cacgcaagtg	898
ccagggctgg gcccttcca aatgtccctc caacacagat ccgcaagagt aaaggaaata	958
agagcagtca caacagagtg aaaaatctta agtaccaatg ggaagcaggg aattcctggg	1018
gtaaagtatc acttttctgg ggctgggcta ggcataggtc tctttgcttt ctggtggtgg	1078
cctgtttgaa agtaaaaacc tgcttggtgt gtaggttccg tatctccctg gagaagcacc	1138
agcaattctc tttcttttac tgttatagaa tagcctgagg tcccctcgtc ccatccagct	1198
accaccacgg ccaccactgc agccgggggc tggccttctc ctacttaggg aagaaaaagc	1258
aagtgttcac tgctccttgc tgcattgatc caggagataa ttgtttcatt catcctgacc	1318
aagactgagc cagcttagca actgctgggg agacaaatct cagaaccttg tcccagccag	1378
tgaggatgac agtgacaccc agaggagta gaatacgcag aactaccagg tggcaaagta	1438
cttgatcatag actcctttgc taatgctatg caaaaaattc tttagagatt ataacaaatt	1498
tttcaaataca ttccttagat accttgaaag gcaggaaggg aagcgtatat acttaagaat	1558
acacaggata ttttgggggg cagagaataa aacgttagtt aatccctttg tctgtcaatc	1618
acagtctcag ttctcttgct ttcacattgt acttaaacct cctgctgtgc ctgcgcatcct	1678
atgcttaata aaagaacatg cttgaatatc aaaaaaaaaa aaaaaaaaaa aaaa	1732

<210> 33
 <211> 234
 <212> PRT
 <213> Homo sapiens

<400> 33
Met Ala Ala Leu Arg Tyr Ala Gly Leu Asp Asp Thr Asp Ser Glu Asp
1 5 10 15
Glu Leu Pro Pro Gly Trp Glu Glu Arg Thr Thr Lys Asp Gly Trp Val
20 25 30
Tyr Tyr Ala Asn His Thr Glu Glu Lys Thr Gln Trp Glu His Pro Lys
35 40 45
Thr Gly Lys Arg Lys Arg Val Ala Gly Asp Leu Pro Tyr Gly Trp Glu
50 55 60
Gln Glu Thr Asp Glu Asn Gly Gln Val Phe Phe Val Asp His Ile Asn
65 70 75 80
Lys Arg Thr Thr Tyr Leu Asp Pro Arg Leu Ala Phe Thr Val Asp Asp
85 90 95
Asn Pro Thr Lys Pro Thr Thr Arg Gln Arg Tyr Asp Gly Ser Thr Thr
100 105 110
Ala Met Glu Ile Leu Gln Gly Arg Asp Phe Thr Gly Lys Val Val Val
115 120 125
Val Thr Gly Ala Asn Ser Gly Ile Gly Phe Glu Thr Ala Lys Ser Phe
130 135 140
Ala Leu His Gly Ala His Val Ile Leu Ala Cys Arg Asn Met Ala Arg
145 150 155 160
Ala Ser Glu Ala Val Ser Arg Ile Leu Glu Glu Trp Gln Gln Gly Ala
165 170 175
Ala Thr Thr Val Tyr Cys Ala Ala Val Pro Glu Leu Glu Gly Leu Gly
180 185 190
Gly Met Tyr Phe Asn Asn Cys Cys Arg Cys Met Pro Ser Pro Glu Ala
195 200 205
Gln Ser Glu Glu Thr Ala Arg Thr Leu Trp Ala Leu Ser Glu Arg Leu
210 215 220
Ile Gln Glu Arg Leu Gly Ser Gln Ser Gly
225 230

<210> 34
<211> 19
<212> DNA
<213> Homo sapiens

<400> 34
agcaggcgtg agcggtcgg

19

<210> 35
<211> 23
<212> DNA
<213> Homo sapiens

<400> 35
actggatttc agcttcgtgg tcg

23

<210> 36
<211> 20
<212> DNA

<213> Homo sapiens

<400> 36
tccgtgggct gtgcagggtc

20

<210> 37
<211> 28
<212> DNA
<213> Homo sapiens

<400> 37
ttccccctac ttccttctta tatctggc

28

<210> 38
<211> 27
<212> DNA
<213> Homo sapiens

<400> 38
atcctcactc caccctatga tctcatc

27

<210> 39
<211> 24
<212> DNA
<213> Homo sapiens

<400> 39
atgggtcttta cttctccctg gcac

24

<210> 40
<211> 29
<212> DNA
<213> Homo sapiens

<400> 40
acttctgcta agattacaga tacacactg

29

<210> 41
<211> 26
<212> DNA
<213> Homo sapiens

<400> 41
agttctttca ggtttaagga ataagc

26

<210> 42
<211> 28
<212> DNA
<213> Homo sapiens

<400> 42
tagatctaag tggatctcat tatagcag 28

<210> 43
<211> 25
<212> DNA
<213> Homo sapiens

<400> 43
acttggggta atttaagtgg tgctc 25

<210> 44
<211> 27
<212> DNA
<213> Homo sapiens

<400> 44
aactttacac actccactga aatctcc 27

<210> 45
<211> 21
<212> DNA
<213> Homo sapiens

<400> 45
attaaacagg ggaattccga c 21

<210> 46
<211> 21
<212> DNA
<213> Homo sapiens

<400> 46
tctcccaatt gtgttcatct g 21

<210> 47
<211> 19
<212> DNA
<213> Homo sapiens

<400> 47
acatccatgg atcccgaag 19

<210> 48
<211> 23
<212> DNA
<213> Homo sapiens

<400> 48
tggtatgaga aaggggataa gtg 23

<210> 49
<211> 25
<212> DNA
<213> Homo sapiens

<400> 49
tgcaccacagc attccttaga tttcc 25

<210> 50
<211> 20
<212> DNA
<213> Homo sapiens

<400> 50
accagactca tgcccgaag 20

<210> 51
<211> 23
<212> DNA
<213> Homo sapiens

<400> 51
aaatgacgcc atctcatcac tcc 23

<210> 52
<211> 24
<212> DNA
<213> Homo sapiens

<400> 52
tgttttcttg gcatctacga gaag 24

<210> 53
<211> 17
<212> DNA
<213> Homo sapiens

<400> 53
tttttaacag tcacacc 17

<210> 54
<211> 17
<212> DNA
<213> Homo sapiens

<400> 54

tgtgtttcag atttgcc 17

<210> 55
<211> 17
<212> DNA
<213> Homo sapiens

<400> 55
ttttgggcag ccatata 17

<210> 56
<211> 17
<212> DNA
<213> Homo sapiens

<400> 56
taaaccatag gggtcga 17

<210> 57
<211> 17
<212> DNA
<213> Homo sapiens

<400> 57
ctcattgcag cataaag 17

<210> 58
<211> 17
<212> DNA
<213> Homo sapiens

<400> 58
ttttttcagg cctcttc 17

<210> 59
<211> 17
<212> DNA
<213> Homo sapiens

<400> 59
tatttttaag atttaca 17

<210> 60
<211> 17
<212> DNA
<213> Homo sapiens

<400> 60
ggatttccag caacagg 17

<210> 61
<211> 17
<212> DNA
<213> Homo sapiens

<400> 61
acgccaagta aggggggc 17

<210> 62
<211> 17
<212> DNA
<213> Homo sapiens

<400> 62
gcaggagggtt tgtatgt 17

<210> 63
<211> 17
<212> DNA
<213> Homo sapiens

<400> 63
ttgttgagta agtgtct 17

<210> 64
<211> 17
<212> DNA
<213> Homo sapiens

<400> 64
ggaataggta ggctctt 17

<210> 65
<211> 17
<212> DNA
<213> Homo sapiens

<400> 65
agaatgggta agcgctt 17

<210> 66
<211> 17
<212> DNA
<213> Homo sapiens

<400> 66
gaatgtgtga gtgttcc 17

<210> 67
<211> 17
<212> DNA
<213> Homo sapiens

<400> 67
cccatcggtg ggtttga

17

<210> 68
<211> 17
<212> DNA
<213> Homo sapiens

<400> 68
gtccatggta agagaac

17